

MARKED VERSION OF SUBSTITUTE ABSTRACT

An optical detection system [is adapted particularly for detection of biological reactions, especially fluorescent or chemilluminесcent reactions. An] an excitation source[, preferably a laser, illuminates a portion of] to illuminate an object[ to be examined, the portion preferably comprising one microlocation out of an array of microlocations]. An [intervening] optical detection platform [serves to] directs the excitation radiation[, preferably through use of a scanning system, most preferably through use of an x-y mirror-based scanning system] to [the portion of] the object[ to be illuminated]. A detector[, preferably a photomultiplier tube,] receives [the] emitted radiation from the object[s to be examined, the detector being characterized in that the diameter of]. [t]The examined region [examined by the detector] is the same as or smaller than the diameter of the illuminated region, and [comprises]is less than the entire surface of the object[ to be examined, and most preferably images a whole or a part of a single microlocation]. [Preferably, the excitation source is coupled to the optical detection platform via an optical fiber. In operation, a confocal microscopy system is formed in which t]The excitation radiation is [substantially in] focused at the surface of the object[ to be examined, t]The excitation radiation has [having] a lateral extent less than the [entire] diameter of the object[ to be examined], and the detection system has [having] a lateral field of view [of a diameter substantially] the same as or less than the diameter of the excitation region. [In one aspect of this invention, t]The optical detection platform includes an excitation detector that [which] measures reflected excitation radiation from the object[ to be examined]. This information is [then] compared to [prestored information regarding] the location of the microlocations and interstitial regions on the object to obtain [be examined, whereby ]alignment information[ is obtained]. The excitation radiation is [may] then [be precisely directed] to a [given]

microlocation or portion thereof so as to perform the examining through the confocal system.

Significant increases in signal-to-noise ratio are achieve].